

LOW TIDES.

Eastport, Maine, 9th.

TEMPERATURE OF WATER.

The temperature of water as observed in rivers and harbors during June 1884, with the average depth at which the observations were made and the mean temperature of the air at the various stations, are given in the table below. The highest observed water temperatures are: 89°.4 at Indianola, Texas, 88°.4 at Key West, Florida, and 87°.0 at Galveston, Texas; the lowest are: 38°.2 at Marquette, Michigan, 40° at Eastport, Maine, and 40°.3 at Duluth, Minnesota. The greatest monthly ranges are: 23°.5 at Norfolk, Virginia, 22° at Duluth, Minnesota, 20°.4 at Chincoteague, Virginia, and 20°.1 at Cleveland, Ohio; the smallest are: 4°.3 at Savannah, Georgia, 4°.4 at San Francisco, California, and 5°.8 at Wilmington, North Carolina.

Temperature of water for June, 1884.

Station.	Temperature at bottom.		Range.	Average depth, feet and inches.		Mean temperature of the air at station.
	Max.	Min.		ft.	in.	
Atlantic City, New Jersey.....	72.0	59.4	12.6	4	7	66.4
Alpena, Michigan.....	71.7	60.0	11.7	12	2	61.5
Augusta, Georgia.....	80.7	70.6	10.1	11	2	74.2
Baltimore, Maryland.....	77.0	67.5	9.2	9	9	73.2
Block Island, Rhode Island.....	63.3	54.1	9.2	8	3	62.3
Boston, Massachusetts.....	65.6	53.9	11.7	21	1	66.0
Buffalo, New York.....	72.0	54.4	17.6	9	10	65.5
Canby, Fort, Washington.....	63.6	52.6	11.0	15	9	55.2
Cedar Keys, Florida.....	81.8	77.2	4.6	8	11	78.2
Charleston, South Carolina.....	83.6	74.4	9.2	43	8	75.6
Chicago, Illinois.....	69.2	52.8	16.4	4	4	65.0
Chincoteague, Virginia.....	81.0	60.6	20.4	4	3	69.1
Cleveland, Ohio.....	77.7	57.6	20.1	14	0	65.5
Detroit, Michigan.....	79.4	55.3	24.1	23	8	70.4
Delaware Breakwater, Delaware.....	78.7	59.1	19.6	9	4	67.1
Duluth, Minnesota.....	62.3	40.3	22.0	9	9	57.7
Eastport, Maine.....	49.1	40.0	9.1	15	5	57.4
Escanaba, Michigan.....	67.0	49.6	17.4	18	9	62.6
Galveston, Texas.....	87.0	78.7	8.3	12	6	81.5
Grand Haven, Michigan.....	80.1	64.5	15.6	13	0	67.9
Indianola, Texas.....	89.4	79.3	10.1	8	6	80.2
Jacksonville, Florida.....	84.1	74.3	9.8	18	0	76.9
Key West, Florida.....	88.4	79.7	8.7	15	9	81.7
Mackinaw City, Michigan.....	66.6	49.6	17.0	10	0	60.9
Macon, Fort, North Carolina.....	81.0	66.0	15.0	8	7	73.2
Marquette, Michigan.....	54.1	38.2	15.9	10	0	59.7
Milwaukee, Wisconsin.....	62.8	45.3	17.5	8	0	60.3
Mobile, Alabama.....	82.1	77.4	4.7	16	2	77.8
New Haven, Connecticut.....	74.7	57.7	17.0	15	8	66.8
New London, Connecticut.....	62.4	54.0	8.4	12	9	65.1
New York City.....	68.7	59.5	9.2	16	3	68.7
Norfolk, Virginia.....	86.0	62.5	23.5	16	10	73.4
Pensacola, Florida.....	81.3	76.5	4.8	17	7	75.6
Portland, Maine.....	53.3	48.7	4.6	10	2	66.3
Portland, Oregon.....	68.1	62.0	6.1	67	6	62.7
Sandusky, Ohio.....	78.5	61.0	17.5	11	11	69.9
Sandy Hook, New Jersey.....	71.2	56.3	14.9	1	10	68.4
San Francisco, California.....	62.5	58.1	4.4	39	1	59.0
Savannah, Georgia.....	78.3	74.0	4.3	10	2	75.6
Smithville, North Carolina.....	81.0	71.0	10.0	10	1	74.1
Toledo, Ohio.....	79.3	63.7	15.6	12	5	70.7
Wilmington, North Carolina.....	78.3	72.5	5.8	18	7	73.9

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for June, 1884, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 83.44 per cent. The percentages for the four elements are: Weather, 85.97; direction of the wind, 78.39; temperature, 84.75; barometer, 90.90 per cent. By geographical districts, they are: For New England, 80.40; middle Atlantic states, 84.21; south Atlantic states, 84.39; eastern Gulf states, 85.94; western Gulf states, 83.30; lower lake region, 81.76; upper lake region, 82.18; Ohio valley and Tennessee, 85.88; upper Mississippi valley, 85.86; Missouri valley, 80.00; north Pacific coast region, 75.89; middle Pacific coast region, 91.67; south Pacific coast region, 89.17. There were eight omissions to predict out of 3,004, or 0.27 per cent. Of the 2,996 predictions that have been made, forty-nine, or 1.64 per cent., are considered to have entirely failed; one hundred and four, or 3.47 per cent., were one-fourth verified; four hun-

hundred and ten, or 13.68 per cent., were one-half verified; six hundred and fifty-seven, or 21.93 per cent., were three-fourths verified; 1,776, or 59.28 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During June, 1884, eighty-nine cautionary signals were ordered. Of these, eighty, or 89.89 per cent., were justified by winds of twenty-five miles or more per hour at or within one hundred miles of the station. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Seven signals were ordered late. No off-shore signals were ordered during the month. In forty-one cases winds of twenty-five miles or more per hour were reported for which no signals were ordered.

Professor T. C. Mendenhall, director of the "Ohio Meteorological Bureau," reports the following:

"The verification of the railway signals during the month was: for temperature, 93 per cent., and for rain, 77 per cent."

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroral displays occurred during June, as follows:

Fort Totten, Dakota: an auroral light was observed in the north at 8.30 p. m. on the 2d, the display consisting of shooting beams reaching an altitude of about 35°; at 11 p. m., a beam, 5° in width, extended across the sky—starting in the east and terminating on the western horizon; this beam was of a very bright color and remained visible until 2.25 a. m. of the 3d.

Saint Vincent, Minnesota: a faint aurora in the form of beams, having an altitude of 45°, was visible from 11 to 11.25 p. m. of the 2d.

Boston, Massachusetts: a faint auroral light of a whitish color, extending to an altitude of 15°, was observed in the northern sky at 11 p. m. of the 2d; the display continued until daylight of the following morning. At 8.30 p. m. of the 3d the aurora was again visible as a faint light, tinged with pink, reaching an altitude of 20°; this display disappeared at midnight.

Westborough, Massachusetts: an aurora was observed at 3 a. m. of the 3d.

Marquette, Michigan: an aurora, consisting of a faint whitish light, was visible from 12.15 a. m. until nearly daylight of the 4th.

Beloit, Wisconsin: an arch of auroral light, over a dark cloud, was observed on the 11th; altitude about 30°.

Fort Buford, Dakota: auroral beams of a pale whitish color were visible in the northeastern sky at 10.35 p. m., of the 13th; the beams apparently rose from a cumulus cloud at an elevation of 20° and extended to a height of 60°. An auroral display was also seen at this station on the 18th—beginning at 9.50 and continuing until 11.10 p. m. It appeared in the form of an arch of reddish color over a dark segment. The arch extended from northeast to northwest, and, at times, streamers rose from it, extending to a height of 65°.

Blooming Grove, Pennsylvania: a diffuse auroral light was observed in the north during the evening of 15th.

Milwaukee, Wisconsin: a display of the auroral light was observed from 9 to 11.45 p. m. of the 16th. The light was most intense in the northeast; in the north and northwest it was only visible in places. The display consisted of a faint glow over a dark segment, with occasional beams or flashes shooting up from the main body of the light.

Portland, Maine: a faint auroral light was seen between 8.30 and 9.30 p. m. of the 16th.

Helena, Montana: a faint aurora was discernible at about 9 p. m. of the 18th; it appeared in the form of a glow in the north where there were two or three beams of light; no traces of the display were visible at 9.20 p. m.

Fort Maginnis, Montana: a faint auroral light of pale bluish color, covering about 20° of the northern horizon, was observed between 9 and 10.20 p. m. of the 18th.